2020

(CBCS)

(6^{th} Semester)

CHEMISTRY

TENTH PAPER (CHEM/6/CC/362)

(Organic Chemistry - III)

SECTION – A

Put a tick (√) mark against the correct answer in the brackets provided :

1. Which of the following is an example of photochemical reaction?
   a) Photosynthesis
   b) Decomposition of ammonia
   c) Formation of NaOH
   d) Decomposition of HCl

2. Absorption take place in photochemical reactions is due to
   a) ultraviolet and visible
   b) radio wave
   c) only visible
   d) visible and x-rays

3. Norish Type II reaction involved
   a) Proton abstruction
   b) Hydride on abstruction
   c) Hydrogen abstruction
   d) Rearrangement without abstruction.

4. Which of the following electronic arrangement is most stable ?
   a) Singlet (S_1)
   b) Triplet (T_1)
   c) Singlet (S_2)
   d) Triplet (T_2)

5. Emission without a change in spin multiplicity is called:
   a) Phosphorescence
   b) Fluorescence
   c) spin forbidden
   d) intersystem crossing

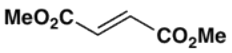
6. Which of the following is a type of pericyclic reaction?
   a) cycloelimination reactions
   b) acyclic reactions
   c) electrophilic reactions
   d) electrolytic reactions

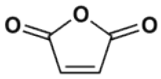
7. In conrotatory mode,
   a) the atomic orbitals of the end groups do not rotate
   b) the atomic orbitals of the end groups turn in opposite
   c) atomic orbitals of the end groups turn in the same
   d) none of these

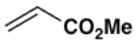
8. A cycloaddition is a reaction between two compounds with
   a) π* bonds to form a cyclic product with two new σ bonds
   b) σ* bonds to form a cyclic product with two new π bonds
   c) σ bonds to form a cyclic product with two new π bonds
   d) π bonds to form a cyclic product with two new σ bonds

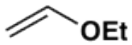
9. How many nodes are in the lowest energy π molecular orbital of 1,3,5-hexatriene?
   a) 0
   b) 1
   c) 2
   d) can not be determine

10. Which of the following dienophiles is the most reactive with buta-1,3-diene?

    a) 

    b) 

    c) 

    d) 

11. Which one is not organometallic compound:
    a) CH_3CH_2ONa
    b) CH_3CH_2Li
    c) CH_3CH_2MgBr
    d) $CH_3CH{=}CHNa$

12. Organolithium can be prepared by
    a) Frankenstein reaction
    b) Shapiro reaction
    c) Mannich reaction
    d) Michael addition

13. Grignard's reagent can not be used in the preparation of
    a) Alcohol
    b) Aldehyde
    c) Amines
    d) None of these

14. Thiol group contain the functionality R−SH. Thiols are structurally similar to the
    a) Ketone group
    b) Aldehyde group
    c) alcohol group
    d) Amines group

15. Diethyl ether is an especially good solvent for the formation of Grignard reagents for this reason
    a) Ether has no acidic protons
    b) Ethers are non- polar
    c) Ethers are basic in nature
    d) None of these

16. The principles of Green chemistry include the eliminating
    a) the costly treatment
    b) the harmful treatment
    c) the chemical treatment
    d) none of these

17. Aldol condensation is self condensation of aldehyde having
    a) α – hydrogen
    b) β – hydrogen
    c) γ – hydrogen
    d) None of these

18. Tick the incorrect statement,
    "Microwave assisted synthesis provides "
    a) Enhanced chemical reaction
    b) Increase purity
    c) Increase reducing agents
    d) Increase reaction yields

19. The oxidation of ketones to ester with hydrogen peroxide or with peracids (RCO_3H) is known as :
    a) Wittig reaction
    b) Hofmann elimination
    c) Michael addition
    d) Dakins reaction

20. 2-chloro-N-aryl anthranilic acid is prepared by
    a) Aldol condensation
    b) Ullmann condensation
    c) Dieckmann condensation
    d) Claisen condensation

21. Number of NMR signal present in 1,2 – dichloropropane is
    a) 1
    b) 2
    c) 3
    d) 4

22. Structural isomers can be identify using
    a) UV spectroscopy
    b) NMR spectroscopy
    c) Mass spectroscopy
    d) IR spectroscopy

23. How many spin states are possible for ^{1}H nucleus ?
    a) 2
    b) 3
    c) 4
    d) 5

24. Metastable peaks can be easily determined in mass spectroscopy by
    a) These are much narrow than normal peak
    b) They do necessarily occur at the integral m/e values
    c) These are of relatively low abundance
    d) None of these

25. The distance between the centres of the two adjacent peaks in a multiplet is called
    a) Base peak
    b) Molecular ion peak
    c) Chemical shift
    d) Coupling constant

SECTION B
(Fill in the blanks)

1. The Franck–Condon principle is a rule in spectroscopy and quantum chemistry that explains the _____of vibronic transitions.
2. The Jablonski diagram is widely used in_____ spectroscopy to illustrate the excited states of a molecule and the radiative and non-radiative transitions that can occur between them.
3. The presence of _____ species in solution enhances intersystem crossing.
4. If a component undergoes addition (forms bond) on the same face, it is called a _____ component.
5. A _____ is an alkene with an electron-withdrawing group.
6. The Diels-Alder reaction is just one example of a_____reaction.
7. Thioethers are typically prepared by_____ of thiols.
8. One of the most common uses of Grignard reagents is in their reaction with aldehydes and ketones to form _____
9. organozincs are much _____nucleophilic than Grignards.
10. _____ is defined as environmentally benign chemical synthesis.
11. Wittig reactions are most commonly used to couple _____ and _____ to singly substituted phosphine ylides.
12. _____refers to the use of living systems or their parts to speed up chemical reactions.
13. Mass spectroscopy is used to determine the molecular weight of compounds by separating molecular ions on the basis of their mass and _____.
14. The resonance of a proton with *n* equivalent protons on the adjacent carbon will be split into n + 1 peaks with a _____
15. chemically equivalent protons do not exhibit _____ coupling to each other.

KEY TO ANSWER
(Bold letters are the correct answer)

SECTION – A

Put a tick (√) mark against the correct answer in the brackets provided :

1. Which of the following is an example of photochemical reaction?
   a) **Photosynthesis**
   b) Decomposition of ammonia
   c) Formation of NaOH
   d) Decomposition of HCl

2. Absorption take place in photochemical reactions is due to
   a) ultraviolet and visible
   b) radio wave
   c) only visible
   d) visible and x-rays

3. Norish Type II reaction involved
   a) Proton abstruction
   b) Hydride on abstruction
   c) Hydrogen abstruction
   d) Rearrangement without abstruction.

4. Which of the following electronic arrangement is most stable ?
   a) Singlet (S_1)
   b) Triplet (T_1)
   c) Singlet (S_2)
   d) Triplet (T_2)

5. Emission without a change in spin multiplicity is called:
   a) Phosphorescence
   b) Fluorescence
   c) spin forbidden
   d) intersystem crossing

6. Which of the following is a type of pericyclic reaction?

a) cycloelimination reactions
b) acyclic reactions
c) electrophilic reactions
d) **electrolytic reactions**

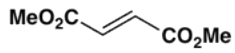
7. In conrotatory mode,

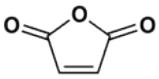
a) the atomic orbitals of the end groups do not rotate
b) the atomic orbitals of the end groups turn in opposite
c) **atomic orbitals of the end groups turn in the same**
d) none of these

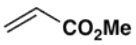
8. A cycloaddition is a reaction between two compounds with
a) π* bonds to form a cyclic product with two new σ bonds
b) σ* bonds to form a cyclic product with two new π bonds
c) σ bonds to form a cyclic product with two new π bonds
d) **π bonds to form a cyclic product with two new σ bonds**

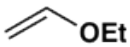
9. How many nodes are in the lowest energy π molecular orbital of 1,3,5-hexatriene?
a) 0
b) 1
c) 2
d) can not be determine

10. Which of the following dienophiles is the most reactive with buta-1,3-diene?

a) 

b) 

c) 

d) 

11. Which one is not organometallic compound:

a) CH_3CH_2ONa
b) CH_3CH_2Li
c) CH_3CH_2MgBr
d) $CH_3CH{=}CHNa$

12. Organolithium can be prepared by
    a) Frankenstein reaction
    b) Shapiro reaction
    c) Mannich reaction
    d) Michael addition

13. Grignard's reagent can not be used in the preparation of
    a) Alcohol
    b) Aldehyde
    c) Amines
    d) None of these

14. Thiol group contain the functionality R−SH. Thiols are structurally similar to the
    a) Ketone group
    b) Aldehyde group
    c) alcohol group
    d) Amines group

15. Diethyl ether is an especially good solvent for the formation of Grignard reagents for this reason
    a) Ether has no acidic protons
    b) Ethers are non- polar
    c) Ethers are basic in nature
    d) None of these

16. The principles of Green chemistry include the eliminating
    a) the costly treatment
    b) the harmful treatment
    c) the chemical treatment
    d) none of these

17. Aldol condensation is self condensation of aldehyde having
    a) α – hydrogen
    b) β – hydrogen
    c) γ – hydrogen
    d) None of these

18. Tick the incorrect statement,
    "Microwave assisted synthesis provides "
    a) Enhanced chemical reaction
    b) Increase purity
    c) Increase reducing agents
    d) Increase reaction yields

19. The oxidation of ketones to ester with hydrogen peroxide or with peracids (RCO_3H) is known as :
    a) Wittig reaction
    b) Hofmann elimination
    c) Michael addition
    d) Dakins reaction

20. 2-chloro-N-aryl anthranilic acid is prepared by
    a) Aldol condensation
    b) Ullmann condensation
    c) Dieckmann condensation
    d) Claisen condensation

21. Number of NMR signal present in 1,2 – dichloropropane is
    a) 1
    b) 2
    c) 3
    d) 4

22. Structural isomers can be identify using
    a) UV spectroscopy
    b) NMR spectroscopy
    c) Mass spectroscopy
    d) IR spectroscopy

23. How many spin states are possible for ^1H nucleus ?
    a) 2
    b) 3
    c) 4
    d) 5

24. Metastable peaks can be easily determined in mass spectroscopy by
    a) These are much narrow than normal peak
    b) They do necessarily occur at the integral m/e values
    c) These are of relatively low abundance
    d) None of these

25. The distance between the centres of the two adjacent peaks in a multiplet is called
    a) Base peak
    b) Molecular ion peak
    c) Chemical shift
    d) Coupling constant

SECTION B

Fil in the blanks

1. The Franck–Condon principle is a rule in spectroscopy and quantum chemistry that explains the **intensity** of vibronic transitions.
2. The Jablonski diagram is widely used in **fluorescence** spectroscopy to illustrate the excited states of a molecule and the radiative and non-radiative transitions that can occur between them.
3. The presence of **paramagnetic** species in solution enhances intersystem crossing.
4. If a component undergoes addition (forms bond) on the same face, it is called a **suprafacial** component.
5. A **dienophile** is an alkene with an electron-withdrawing group.
6. The Diels-Alder reaction is just one example of a **pericyclic** reaction.
7. Thioethers are typically prepared by **alkylation** of thiols.
8. One of the most common uses of Grignard reagents is in their reaction with aldehydes and ketones to form **alcohols**
9. organozincs are much **less** nucleophilic than Grignards.
10. **Green chemistry** is defined as environmentally benign chemical synthesis.
11. Wittig reactions are most commonly used to couple **aldehydes** and **ketones** to singly substituted phosphine ylides.
12. **Biocatalysis** refers to the use of living systems or their parts to speed up chemical reactions.
13. Mass spectroscopy is used to determine the molecular weight of compounds by separating molecular ions on the basis of their mass and **charge**.
14. The resonance of a proton with *n* equivalent protons on the adjacent carbon will be split into n + 1 peaks with a **coupling constant**
15. chemically equivalent protons do not exhibit **spin-spin** coupling to each other.